Simulation and Gaming for Policy Advice

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Abstract

This chapter aims at extending the policy advisor's toolbox, by presenting the potential of serious games to support the whole spectrum of advisory and analytical processes behind public policymaking. Serious games are structured and interactive exercises, reproducing the elements of reality, within a set of rules, wherein participants individually, or collectively, organize and act to solve a dilemma and experience the effects of their actions through a feedback mechanism, built deliberately into and around the game. The lessons learned (both individual and social) are transferrable to the world outside the game. 'Multilogue', the unique 'simultaneous dialogue of multiple actors in pursuit of a greater understanding of the topic at hand' (Duke, Richard D. *Gaming the future's language*. New York: Sage, 1974), takes place both during the game and the debriefing afterwards, and constitutes a crucial feature of the advisory potential of gaming.

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Starting with a brief sketch of the origins and development of serious games, the chapter moves on to their potential as advisory tools, supporting various stages of policymaking processes, as well as educational devices, enhancing the broader quality of advisory systems and processes. It concludes with an introduction of the basic principles of a design methodology for serious games.

Keywords
Serious games · Simulation games · Policy advice · Policy analysis · Policy cycle

1 Introduction

Among the various methods applied by policy analysts and advisors to guide decision-makers and stake-holders through the policymaking process, there is one category that is especially well suited to 'capture and integrate both the technical-physical and the social-political complexities of policy problems' (Mayer 2009, p. 825). It is a tool that can provide a space for problem-solving and a policy exercise (Brynen and Milante 2012, p. 29). It can also make it possible to gain clarity about objectives and test options for resolution and to see, as well as experience and extrapolate, problems from different perspectives by adopting roles (Bots and van Daalen 2007, pp. 512–513). Last, but not least, it is an approach that enables one to study how future policy and people's behaviours affect each other (Caluwe et al. 2012, p. 612), as well as engage stakeholders, bridging 'the gap between local, scientific, technical, and policy knowledge' (Bassi et al. 2015, p. 405).

The unique method described above, as the focus of the following chapter, is recognized under many labels, the most popular being 'simulation/gaming', 'gaming for serious purposes', and 'serious games' (Harteveld 2011),[1] although the catalogue of game-related terms is growing. One of the recent buzz-words is *gamification,* which refers to the process of incorporating game-design principles (points, score boards, progress bars, levels, rewards) into the real life activities of people (employees, clients and customers, users, citizens) to build their engagement and solve problems (McGonigal 2011; Deterding et al. 2011; Mayer et al. 2016).[2]

Although there is no single, rigorous definition of what is deemed a 'serious game' in the literature, several elements seem to constitute the essence of gaming. Therefore, we understand serious games broadly as structured, interactive exercises, **reproducing the elements of reality**, within **a set of rules**, wherein **participants, individually or collectively, organize** and act to **solve a dilemma** and **experience the effects of their actions** through a feedback mechanism, built deliberately into

[1]For a more elaborate picture of the definition challenges, see Mayer et al. 2014.

[2]The gamification approach has already been widely used in marketing and health and increasingly attracts the attention of policymakers. The mechanics of gamification and its potential use in the public sector is well illustrated by the example of a campaign in Sweden, which introduced a speed camera lottery to reward drivers who stayed within the speed limit, with the intention of using 'the mixture of fun and competition' to influence behaviour (Chambers 2015).

and around the game. The lessons learned (both individual and social) should be **transferrable to the world outside the game** (Caluwé et al. 2008, p. 20; Mayer 2009). The unique 'simultaneous dialogue of multiple actors in pursuit of a greater understanding of the topic at hand', called 'multilogue' (Duke 1974), takes place both during the game and the debriefing afterwards.

The formats of serious games may vary, from card, board, and role-playing games to computer simulations and computer-assisted scenarios; the list is endless (see Fig. 1). Similarly, the length of a game may also differ and last from several minutes to several days or even weeks. Most importantly, serious games and gamification efforts should have a '**meaningful purpose**' and aim at achieving something beyond entertainment, be it learning, research, policy development, implementation, or organizational change (Caluwé et al. 2010).

This chapter presents and discusses the analytical and advisory potential of games, both throughout the policy cycle and beyond it. Starting with a brief sketch of the origins and developments of serious games, we move on to their potential as tools to support various stages of policymaking processes, as well as educational devices enhancing the broader quality of advisory systems and processes. We end with an introduction of the basic principles of a design methodology for serious games.[3]

2 The Origins of Serious Gaming

The meaningful application of games and their elements has deep historical roots. Play (being the fundamental ingredient of games) can be regarded as the primary, formative element in human culture, contributing 'to rituals, ceremonies, law, war, philosophy and arts. Play includes seriousness, play means something, play helped to establish civilization' (Huizinga [1938] 1955 later: Harteveld 2011).

The first trace of advisory gaming may be the game of Go, originating in China around 2300 BC. According to one of many legends, it was designed by the advisor of Emperor Yao to enlighten the emperor's son and stimulate his intellectual development (Botermans 2008).

Another helpful example explaining the origins of serious games is chess, considered the earliest known military simulation. Developed in the sixth century, the board depicted war territory and allowed warlords and generals to test strategies in advance, coming up with alternatives, understanding the system, and experimenting with its elements (Leigh 2003).

Go and chess illustrate two functions of gaming that seem fundamental to the further development of the discipline throughout other areas of application: one

[3]Our way of talking about serious games in advisory contexts has been inspired and influenced by the approach of Bots and van Daalen (2007) and Mayer et al. (2013), who have described policy analysis via a hexagonal model and apply metaphors and vivid comparisons to talk about the various functions games can fulfil. Expressing our gratitude for this inspiration, we also try to capture the potential roles of games in the forms of metaphor and comparison.

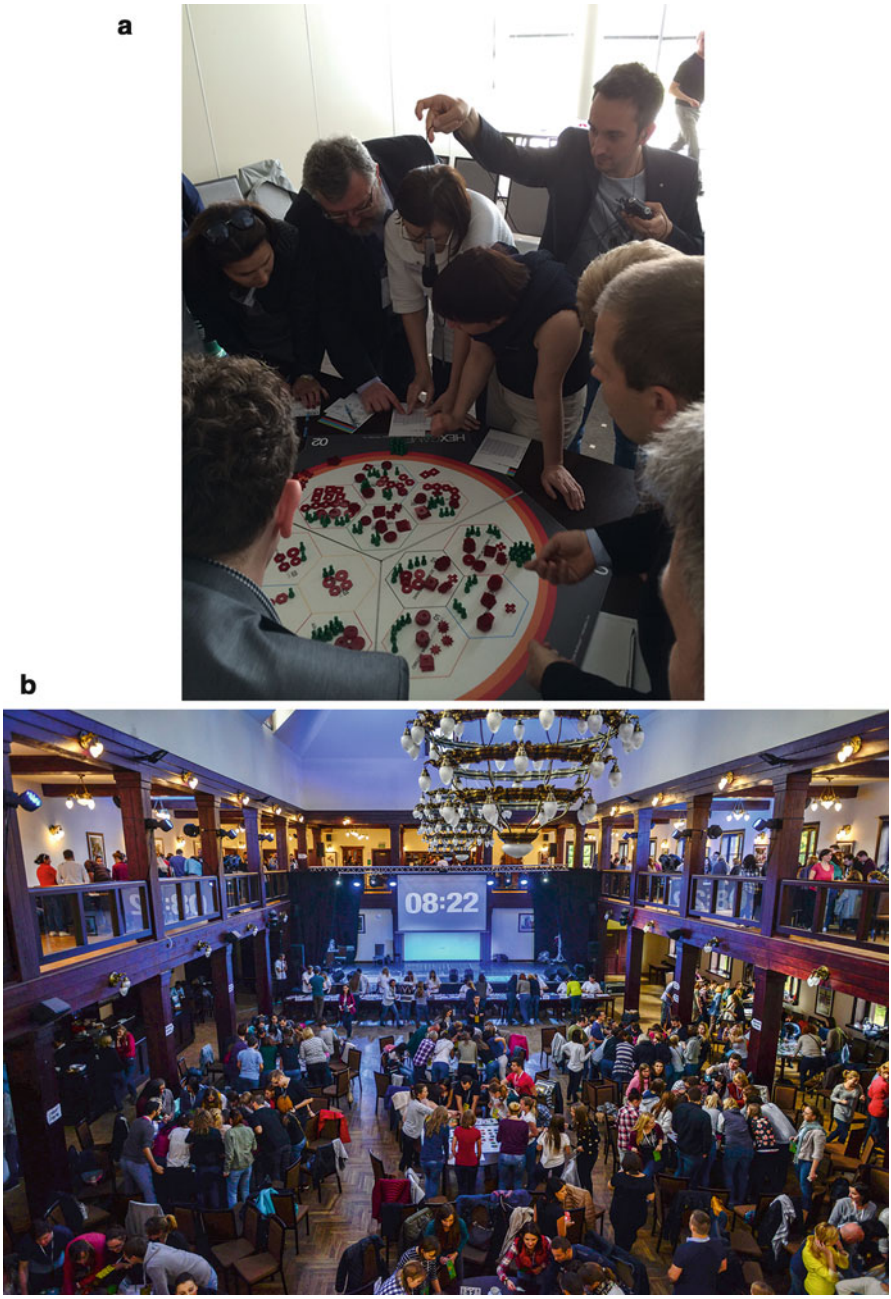

Fig. 1 (continued)

Fig. 1 Examples of serious game formats and applications. (**a**) Hexgame, played by general managers from ministries in Poland during a cooperation and communication training session, (a board and role playing game for skills development and awareness raising); (**b**) the Tree of Life used for all employees to prepare for a major organizational change (board and role-playing game); (**c**) the Knowledge Brokers game used to train policymakers on how to support the use of evidence in decision-making

consists of inspiring and developing skills, the other in experimenting and testing strategies beforehand. The potential behind those functions, first appreciated in military circles, has gradually gained much wider recognition and has started to be applied in: the corporate sector for production and operation optimization and managerial training, in international affairs, in sustainable urban planning, in education and, subsequently, across other domains of the public sector, as a tool that supports the whole spectrum of processes behind public policymaking (Mayer 2009) (see Fig. 2).

3 Gaming Throughout the Policy Cycle

Bridging simulation/gaming and policy-studies literature, we decided to structure a broad overview of the possible advisory applications of the simulation/gaming method (summarised in Table 1) by referring to a popular heuristic of the

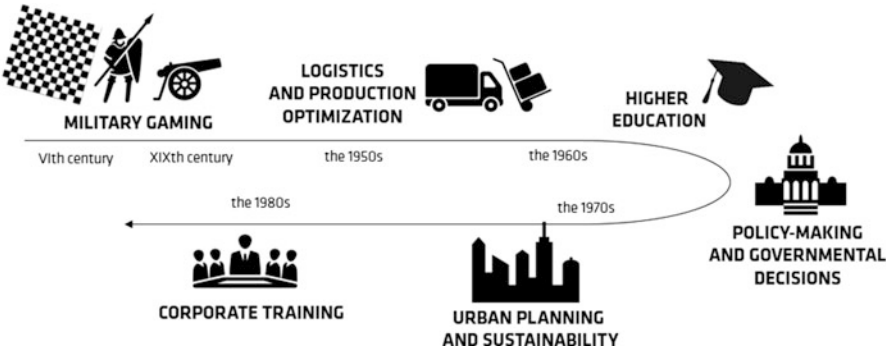

Fig. 2 A brief history of serious games: a sketch. Our own elaboration based on Mayer (2009)

policy cycle. It is conventionally used to describe the chronology of the sequential steps of policy-making and includes the following basic stages: (1) problem identification and agenda-setting, (2) policy formulation and decision-making, (3) implementation, and (4) evaluation (see Jann and Wegrich 2007, p. 43; Howlett et al. 1995).

3.1 Games for Problem Identification and Agenda-Setting

The first stage of the policy cycle encompasses the definition, recognition, and selection of issues that consequently become a part of the formal political agenda, understood as 'the list of subjects or problems to which government officials, and people outside the government closely associated with those officials, are paying some serious attention at any given time' (Kingdon 1995, p. 3). The path towards attracting the interest of decision-makers often starts with defining a social problem as such and expressing the need for government intervention; it often leads to gaining wider support from the media and the public.

Analysts and advisors, engaged in agenda-setting and its sub-stages, can make use of the special power of the gaming method, which consists of creating engagement – something that even the best analytical paper can hardy achieve. Allowing various stakeholders – citizens, journalists, policymakers, public officials, and politicians – to experience how serious a given problem actually is (e.g. by letting them play the role of a member of a disadvantaged group) may well enhance that problem's chances of moving up on the list of government priorities. The **game as an eye-opener** is designed to raise public and decision-makers' awareness of specific problems, such as homelessness, global warming, or the situation of refugees around the world (Bergeron 2006, p. 27). The yearly Refugee Run simulation, organized at the World Economic Forum (WEF) in Davos, serves as an example. It invites delegates to the WEF, including heads of state, CEOs, and non-profit leaders 'to take a few steps in the shoes of refugees, through a simulated environment which

Table 1 Different gaming functions throughout the policy cycle. Our own elaboration (in the stage of policy formulation and decision-making based on Bots and van Daalen 2007)

Gaming functions throughout the policy cycle	
	
Problem identification and agenda-setting	
	**Game as an EYE-OPENER:** raising awareness of selected issues
	**Game as a TRIGGER:** advocating solutions, winning over stakeholders
	**Game as an AGORA:** involving stakeholders in identifying problems (participatory agenda-setting)
Policy formulation and decision-making	
	**Game as a LABORATORY**: testing/assessing/experimenting with the system and the players within a given policy context for research purposes
	**Game as a DESIGN STUDIO:** analyzing and assessing alternative solutions and their consequences to propose a course of action
	**Game as a VIRTUAL PRACTICE RING**: practicing negotiation and consensus-building skills, trying out and acquiring skills for political confrontation in the real-world
	**Game as a NEGOTIATION TABLE**: resolving conflict among stakeholders
	**Game as a CONSULTATIVE FORUM:** democratising decision-making by stimulating stakeholders to express their opinions and ideas in an open way
	**Game as a PARLIAMENT**: articulating and clarifying the tacit values, beliefs, and lines of reasoning behind a policy
Implementation	
	**Game as a SIREN:** building urgency around the (policy) implementation among the staff and stakeholders responsible
	**Game as a FLIGHT SIMULATOR:** communicating and explaining the key policy rules to the stakeholders
	**Game as COALITION BUILDING:** building a leadership coalition around the implementation among stakeholders, staff, and the wider public
Evaluation	
	**Game as a CRASH TEST**: trying out a policy in a controlled environment before its implementation to receive behavioural insights and provide evidence-based advice about the potential success of intended measures
	**Game as a DIAGNOSTIC TEST**: estimating to what extent the intended outcome of a policy has been internalized by the target groups, especially in organizational culture-change processes

re-creates some of the struggles and choices they face to survive, each day' (Crossroads Foundation 2016a, http://www.refugee-run.org/).[4]

Many simulations and games go one step further (beyond opening eyes) and advocate certain solutions for overcoming problems that the game addresses (Thorngate and Tavakoli 2009, p. 513). Their design allows participants to recognize the proposed policy as an effective remedy for the problem at hand, consequently triggering expected actions and behaviours in real life. Such instruments – let us call them '**triggers**' – are sometimes referred to as 'advocacy games' or 'persuasive games'. For example, 'Half the Sky Movement: The Game'[5] not only raises awareness of the situation of women around the world, but also triggers a translation of virtual engagement into real-world donations and social action opportunities.

Not less importantly, simulation and gaming tools (especially with more open formats) can enable participatory agenda-setting (Mayer et al. 2005), can serve as a kind of **agora**, and reflect the idea of 'multilogue' (Duke 1974). Gaming/simulation can function as 'a heuristic device to uncover problem areas' (Vries 1989, p. 288) that derive from differences in views, positions, and approaches (Janssen and Klievink 2010). They should 'represent the policy issue realistically to trigger genuine reactions', but also provide a safe environment that stimulates all stakeholders (but not necessarily all during the same game) to express opinions and ideas in an open way. Decision-makers may take part in the game or be informed about the results afterwards (Bots and van Daalen 2007, p. 520).

3.2 Games for Policy Formulation and Decision-Making

The second phase of the policy cycle heuristic ranges from analysing the problems previously placed on the agenda to formulating and evaluating alternative policy proposals to decision-making. Proposed courses of action are developed during this phase to resolve the problems identified beforehand (Kraft 2016, p. 78). Policy analysts and advisors may perform many different tasks at this stage, as 'decision-making comprises not only information gathering and processing (analysis), but foremost consists of conflict resolution within and between public and private actors and government departments (interaction)' (Jann and Wegrich 2007, p. 49).

The broad range of analytic and advisory activities is aptly captured by the hexagonal model of policy analysis developed by Mayer et al. (2013). It shows how and when analysts and advisors are expected to (1) research and analyse, (2) design and recommend, (3) clarify values and arguments, (4) advise strategically, (5) democratise, and (6) mediate. Building on this framework, Bots and van Daalen have proposed an analogous typology of six main functions that games can take on in order to support various forms of policy analysis. According to the metaphors

[4]More simulations of this type can be found at https://www.crossroads.org.hk/home/our-work/international/x-periential-simulations-of-need/, Crossroads Foundation 2016a, 2016b.

[5]Available at http://www.gamesforchange.org/play/half-the-sky-movement-the-game/

used by these authors, a policy game can thus serve as (1) a laboratory, (2) a design studio, (3) a practice ring, (4) a negotiation table, (5) a consultative forum, and (6) a parliament (Bots and van Daalen 2007). Generally speaking, the simulation/gaming method applied at this stage can help policymakers and stakeholders 'in understanding the possible and exploring the feasible' (Vries 1989, p. 288).

A policy game can serve as a **laboratory** when policy analysis is expected to provide research-based information about facts, causes, and effects in a system that does not yet exist in reality, or when it would be too time-consuming, or 'when it is not possible or desirable to include human behaviour by way of a computer model (e.g. because the rational-actor assumption does not hold)' (Bots and van Daalen 2007, p. 514). Games make it possible to create a unique research environment that enables experimental manipulation and the observation of players, offering identical policy environments to the experimental and control group (Caluwe et al. 2012, pp. 603–607). This is well exemplified by the 'Rubber Windmill' policy exercise applied in the UK during the NHS reform of the Thatcher Government (Duke and Geurts 2004).

Games can take the role of a **design studio,** when advisors are supposed to propose a course of action based on analysing and assessing alternative solutions and their consequences. Games used in this context can successfully substitute more conventional techniques of brainstorming and decision-making, generating more original solutions to policy problems. For example, collaborative development of innovative solutions for public service delivery (Klievink and Janssen 2010) and insights about the effects of recommendations (Bots and van Daalen 2007, p. 517).

There are situations when advisors reach for simulation/gaming methods to prepare their clients for political confrontation in the real world. Decision-makers enter **a virtual practice ring** – for example, in the form of a war game – in order to acquire and try out different strategies in a realistic, but simultaneously 'time safe', confrontation with other players, who take on the roles of sparring partners. The gaming environment makes it possible to learn from mistakes without having to risk their careers (Duke and Geurts 2004; Mayer 2008). Such a gaming component enables games 'to be a dominant tool for teaching negotiation and consensus-building skills in many decision-making contexts' (Kim 2014, p. 127).

A game can also serve as **a negotiation table** and be used by advisors who are expected to find a way out of a given conflict among stakeholders. This can be achieved by engaging conflicting parties in a game that deals with a fictitious (but, to some extent, analogous or transferable) problem and provides participants 'with relevant insights for the actual negotiation situation'. Again, a safe gaming environment can often foster new solutions and a change in attitude. Smart game design – promoting consensus and understanding of the positions of 'rivals' (e.g. via role-reversal) – 'may lead to a better appreciation of the other parties' positions (. . .)'. Although solutions resulting from the game do not directly apply to the actual conflict, they often lay a foundation for more effective negotiations (Bots and van Daalen 2007, p. 519).

Games may also be used as a **consultative forum** with the intention of democratising decision-making and enhancing public participation and collaborative gover-

nance. 'Policymakers may consider the use of a game to allow equal access to an NRM policy development process for all stakeholders and to incorporate views and opinions that are typically overlooked in policymaking' (Bots and van Daalen 2007, p. 520). In this form, games can be successfully applied to participatory policy analysis (Geurts and Joldersma 2001).

A game can resemble a **parliament** and be a useful tool when a political advisor is expected to *clarify the values and arguments* that underlay a given social or political debate. The normative and ethical aspects of conflicts, though powerful and persistent, tend to remain implicit and unspoken. A game may help the articulation and understanding of their core.

A proper game design (e.g. the listening type of game, in which different parties put forward their points of view on a selected issue in front of a jury) may reward participants for expressing opinions and positions in a direct way, thereby clarifying their beliefs and lines of reasoning. Participants in the game, who are real stakeholders, gain insights during the game itself, as well as from the *ex post* interpretation presented by the advisor (Bots and van Daalen 2007, pp. 521–522).

An example connecting some functions mentioned above is the 'LamaGame', developed for the Dutch Ministry of Agriculture. Its application supported the process of implementing an EU decree about the electronic identification and registration of animals. The simulation was followed by expert discussions, serving as a consultative forum for various stakeholders (Bervens et al. 2007).

3.3 Games for Implementation

As shown earlier, gaming facilitates policymakers' experimentation and education about complex systems before the plans, policies, or regulations have been implemented (Mayer 2009). However, as a powerful means of raising awareness, providing knowledge, developing skills, and influencing attitudes and motivation (Caluwé et al. 2010), gaming has huge potential to support policy enforcement as well.

The implementation stage, that is, 'what develops between the establishment of an apparent intention on the part of the government to do something, or to stop doing something, and the ultimate impact in the world of action' (O'Toole 2000, p. 266 later: Jann and Wegrich 2007, pp. 51–52), is critical to the success of any policy. It requires numerous minor, yet difficult, decisions and actions that concretize and operationalize the measure in question.

The complexities of this stage can be analysed through the lens of change implementation theory. 'Whenever human communities are forced to adjust to shifting conditions, pain is ever present' (Kotter 1996, p. 4). The *shifting conditions* are, in this context, the policies and regulations being implemented. *Human communities* refer to the professionals responsible for implementation, as well as other stakeholders (target groups and the wider public). Their socio-psychological responses (hard to predict and non-rational) can significantly influence implementation efforts, often causing them to fail. Fortunately, according to Kotter, a 'significant

amount of anguish is avoidable', and gaming can play a significant role in it. Referring to John Kotter's eight-step change model (1996), we mention gaming applications that can help to significantly lower the risk of implementation failure while, at the same time, increasing the credibility of change initiators.

Gaming helps create urgency around the implemented change and sparks the initial motivation 'to get things moving' among the people responsible for the execution, as well as other stakeholders. Therefore, a game can serve as **a 'siren',** calling everyone to action at the very beginning of the implementation process. During a game, participants experience potential threats and scenarios that show what could happen, without commitment to change. The participants examine opportunities and discuss what should and could be done to implement the policy most smoothly. This creates involvement and understanding.

Gaming is a smart tool for '**building a coalition of change leaders'** from different backgrounds, departments, or stakeholder groups, giving them the chance to share the same understanding of goals and challenges behind the change and to continue to build urgency and momentum around the need for change.

Organizations and communities can use games to communicate their visions to their employees, stakeholders, or citizens. In the policy advice and policymaking context, such games can simply **present the new regulation and its consequences and aims to the stakeholders**. To support the communication of policy change, games are used in the function of a ***flight simulator***, 'giving the pilots (the stakeholders – JG-Z, DS) the chance to learn, to make mistakes, and to experience the unexpected without risk to passengers and aircraft (the organization, other stakeholders, the system, the policy – JG-Z, DS)' (Sterman 1989). In the game, participants move to the future and experience life in the 'new reality' (after successful policy implementation). It enhances understanding of the policy and, therefore, lowers anxiety and fear, typical psychological reactions to change.

All the functions mentioned above (creating urgency, building a coalition, serving as a flight simulator) were combined in games used by the institutions involved in Dutch Public Child Care (Peters and van de Westelaken 2009). They were meant to allow decision-makers, managers, and staff from many different organizations to implement an improved care process, requiring a lot of cross-organizational and cross-disciplinary coordination and cooperation.

3.4 Games for Evaluation

Evaluation of policies entails assessment of their design, implementation, and results against intended objectives, as well as reflection on the lessons learned. This is not only the closing stage of the policy cycle (which concludes with the termination of a failed policy or its modification), but also 'a separate subdiscipline in the policy sciences that focuses on the intended results and unintended consequences of policies'. As such, it can be applied throughout the whole policymaking process, be it *ex ante*, *interim*, or *ex post* (Jann and Wegrich 2007, p. 53). The simulation and gaming methods prove to be useful in both cases.

These methods can thus provide a **diagnostic test** to estimate to what extent the intended outcome has been internalized (or is being internalized, as in the case of the monitoring of ongoing projects) by the groups targeted by a given policy. It seems especially useful to apply a game as an *ex post* evaluation tool when the implemented policy is aimed at changing (aspects of) the organizational culture of an institution. According to Schein (1985), who has understood organizational culture as being comprised of values and beliefs shared by members of an organization, change is complete only when it has changed not only declarations but also beliefs and habits: so-called 'ways things get done around here'. In this context, games provide behavioural insights and allow for the assessment of the extent to which people have internalized change, especially at the 'basic assumptions' level. This happens because, 'by involving real people, games bring into the game discourse all kinds of irrationalities and theories-in-use. Most of this knowledge is unconscious, tacit knowledge: games can bring this to the surface and make it visible' (Caluwe et al. 2012, p. 612). For example, in the case of anti-corruption policies, games help overcome the obstacles of evaluation resulting from the low value of declarations. A game can reveal habitual corruption-related practices that people apply while immersed in the game flow. At some points, they may, for example, feel tempted to apply corruption as a way out of a game-related problem.

The simulation and gaming method may also function as a **crash test** conducted *ex ante*, that is, before the implementation of a given policy. Such a crash test offers the opportunity to try out a policy in a controlled environment, considering the largely unpredictable 'human factor'. It may thus provide immediate, evidence-based advice about the potential success of intended measures, eliminating the necessity of waiting until the policy has been implemented in the real world. In the case of policies that fail the test, lessons can be learned without stakeholders running the risk of becoming embittered and without resulting in unnecessary, or ineffective, investments or negative political consequences. Vermaas and Nieuwland (2007) call the meeting of policy simulation and *ex ante* evaluation 'a perfect match' and underline the high reality value of this method (as participants with certain knowledge, experience, and expectations actually play themselves). *Ex ante*, gaming-based, evaluation of 'horizontal accountability' in education (developed and conducted for the Netherlands' Ministry of Education, Culture and Science) provides a positive example of such an approach.

4 Educating People About the Substance and the Process of Policy Advice

Simulation and gaming methods not only successfully support analysts and advisors virtually through all stages of the policymaking cycle, as presented in the sections above, they also have more general educational roles to play, with regard to both the substance and the process of policy advice. 'Simulations have the power to recreate complex, dynamic political processes in the classroom, allowing students [in our

case: present or future analysts, advisors and decision-makers – JG-Z, DS] to examine the motivations, behavioural constraints, resources and interactions among institutional actors' (Smith and Boyer 1996, p. 690) and to learn about institutional rules, as well as the circumstances by which they are shaped.

By engaging providers and recipients of policy advice in a unique educational and experimental experience that balances cognitive and affective engagement (Appelman 2007, p. 1), gaming can fulfil two important functions: Firstly, it can deepen recipients' personal expertise and skills (**game as an academy**) and secondly, it can contribute to mutual understanding on opposite sides of the knowledge-politics divide (**game as a bridge**). Combining these two aspects, in turn, translates into a better quality of advisory processes.

With respect to the first educational function, that of **academy**, the method of simulation and gaming can provide a playful and engaging alternative to traditional ways of transmitting knowledge. As noted by Shaw (2010), serious gaming has been successfully applied *inter alia,* to deepen understanding of national and international decision-making processes, for example, in US foreign policymaking (Shaw 2004), in the UN Security Council (Chasek 2005), in the European Union (Zeff 2003; Van Dyke et al. 2000), in decision-making in a crisis (Boyne 2012), or in international law (Ambrosio 2006) and mediation (Shaw 2006).[6]

The second function – **bridging** the gap between experts and policymakers – seems to be more challenging, due to the deep-rooted nature of said gap. The method of simulation and gaming is not a universal panacea, but it has the unique virtue of providing 'safe spaces in which stakeholders that are not used to working together directly can interact and experiment with tools and approaches not traditionally employed' (Schenk 2014). In such safe spaces, they can pay visits, so to speak, to the operating reality of 'the other' (the decision-maker or analyst/advisor, in our case) and try to learn a bit of his or her language via the method of immersion (Ryan 2000; van Pelt et al. 2015; Kim 2014).

Simulation/gaming designed as 'a training tool for actors in science-politics interface' can also 'allow participants to get insights on the dynamics of incorporating scientific advice into adversarial policymaking' and 'draw much broader lessons about how to produce scientific advice from the beginning', as is the case in Kim's Ground-Level Ozone (2014, pp. 126, 140). It can also demonstrate application, as in the Mayor Game, a dilemma game teaching how to use advice through self-directed learning (van de Ven et al. 2014, p. 376). A new development in this field has been offered by the Knowledge Brokers game, which helps players understand differences in 'the knowledge needs of different policy actors – key politicians, senior civil servants, and project managers' and the ways of 'choosing the dissemination methods preferred by different decision-making actors' (http://knowledgebrokers.edu.pl/).

[6]For an overview, see Shaw 2010.

5 Design: Choosing the Suitable Game Format

Serious games are actually simplified versions of real-life situations or problems. Designing a serious game is a matter of deciding to what extent reality should be reduced, by selecting those real-life variables and elements that are crucial to translating the problem into a game (Peters and van de Westelaken 2014). On the one hand, there are games like chess: very abstract, reduced, and simplified models of reality. On the other hand, there are games and simulations, like the Knowledge Brokers mentioned above: very complex and incorporating many real-life elements and relations into the game flow**.** Figure 3 provides a helpful frame for answering design dilemmas about gaming formats and gaming purposes.

The choice of a suitable game form, the game's duration, and the level of complexity or abstraction follow the intended purpose of the game. The process of aligning the purpose with the design should, therefore, be carefully prepared, as it requires effective cooperation and communication between game designers and their clients. This process should be based on a proven and shared methodology (as opposed to an open, uncontrolled, creative process), which would guarantee the transparency of the process and positively impact the outcome of the design work.

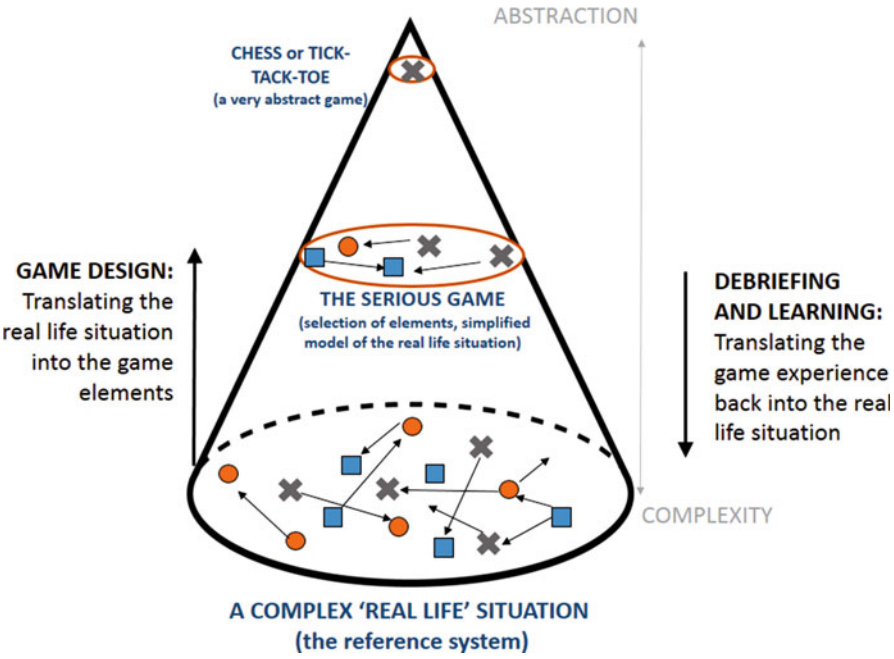

Fig. 3 The design process in the cone of abstraction: translating complex real-life situations into simplified gaming models. Our own elaboration based on Peters and van de Westelaken (2014)

Table 2 The stages of the serious game design process. Our own elaboration based on Peters and van de Westelaken (2014, pp. 9–13)

Stage	Questions to be answered	What happens during this stage	The result of this phase
1. Design specification	What is the purpose of the simulation game? Why is it important? What should the final product look like? Under what circumstances will it be applied? What are the general considerations about its design? Who are the participants? What should their experience be like?	Several meetings between the 'client', game designers, and experts to agree on the specification	**The game specification**
2. System analysis	What does the problem area look like? What are its relevant elements and the relationships between them?	Document analysis, interviews with key stakeholders, experts, and informants; creating a schematic representation of the system elements	**The schematic (of system elements)**
3. Game design	Which results of the system analysis should be incorporated into and represented in the game? What metaphor/format/ dynamics suit the problem? How long should the game last? What game elements should represent the system components?	Correlating the reference system (reality) elements with game components (scenario, rules, dynamics, roles, flow etc.). Designing the game prototype on paper.	**The game prototype on paper**
4. Game construction	What should the game materials and devices look like? Does the game work well (in terms of flow & dynamics and in terms of the learning purpose)? What game elements need to be changed?	Building the actual game materials, testing the game, making changes and improvements	**The final game materials and the facilitator's manual**

The efforts to create a shared game design methodology, initiated in the 1970s (Duke 1974), have continued to evolve the game design process. Table 2 illustrates the most important stages of a serious game design process. It can be a useful checklist for teams working on game development (that is, those consisting of clients and game designers).

6 Conclusion

A 2008 contribution to *The Times* pronounced, 'It's inevitable: soon we will all be gamers' (Fahey 2008). In the field of policy advice, this is still not the case; gaming and simulation methods are rarely the first choice for policy analysts and advisors, at least so far. However, as demonstrated in this chapter, their potential as tools for analysis and design, on the one hand, and for raising the engagement and involvement of stakeholders, on the other, is gaining more and more recognition. Serious games are capable of supporting virtually every stage of the policymaking cycle. They can also enhance the quality of policy advice in general, as facilitators of learning, development, and assessment processes for policy professionals, as well as of communication among stakeholders. In addition, a valid and reliable game design methodology makes it possible to address both practical problems in policymaking and more theoretical research questions in areas where other methodologies are not able to uncover enough (Duke and Geurts 2004).

Simulations and serious games are powerful tools. Placed in good hands, they can contribute to solving some of the world's most pressing problems, as their enthusiasts attest (McGonigal 2011).[7] While the sector of gaming for serious purposes – from classical gamified policy exercises to gamification itself – is undergoing dynamic development, the range of possibilities is only growing. This is especially true in light of the fact that the generation of game-literate, digital natives, 'Millennials', is entering the policymaking stage.

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[7] Jane McGonigal even predicts that a game developer will win the Nobel Peace Prize in the next 25 years. On the other hand, some game-based mechanisms are used on a number of extremist and terrorism-related sites in order to increase loyalty and engagement, as well as to promote a certain ideology.

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